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Claims

1. Method for analysing an OFDM signal ($r_{IF}(t)$) with an analysing device (40) having a signal section (20) with a bandwidth (BW_A) smaller than the bandwidth (BW_{OFDM}) of the OFDM signal, the OFDM signal ($r_{IF}(t)$) transporting a series of data symbols (S1, S2, ...) on several orthogonal carrier frequencies, each data symbol (S1) having a useful part (30) separated by a guard period (31) from neighbouring data symbols (S2),
comprising the steps of low pass filtering of the OFDM signal with a low pass filter (24) and shifting (26) the spectrum of the OFDM signal in order to obtain a frequency shifted filtered OFDM signal ($r(i)$),
whereby the length (τ) of the impulse response ($h(t)$) of the low pass filter (24) is shorter than the length (T_{GP}) of the guard periods (31) of the data symbols (S1, S2, ...).

2. Method according to claim 1,
characterised in that
the length (τ) of the impulse response ($h(t)$) of the low pass filter (24) is shorter than ¼ of the length (T_{GP}) of the guard periods (31) of the data symbols (S1, S2, ...).

3. Method according to claim 2,
characterised in that
the length (τ) of the impulse response ($h(t)$) of the low pass filter (24) is about 2.5/16 of the length (T_{GP}) of guard periods (31) of the data symbols (S1, S2, ...).

4. Method for analysing an OFDM signal ($r_{IF}(t)$) transporting a series of data symbols (S1, S2, ...) on several orthogonal carrier frequencies with an analysing device (40) having a signal section (20) with a bandwidth (BW_A) smaller than the bandwidth (BW_{OFDM}) of the OFDM signal,

whereby a first specific number of carrier frequencies transport a pilot signal within the OFDM signal, comprising the steps of low pass filtering of the OFDM signal with a low pass filter (24) and shifting (26) the spectrum of the OFDM signal in order to obtain a frequency shifted filtered OFDM signal ($r(i)$), and estimating (12) several synchronisation parameters ($\Delta\hat{f}_l, \hat{\xi}_l$) of the OFDM signal by use of the pilot signal, whereby the number of useful carrier frequencies transporting the pilot signal is reduced to a second specific number by the signal section (20) with its bandwidth (BW_A) smaller than the bandwidth (BW_{OFDM}) of the OFDM signal and averaging (12) the estimated synchronisation parameters ($\Delta\hat{f}_l, \hat{\xi}_l$) of the OFDM signal over several data symbols in order to compensate the reduced number of useful carrier frequencies transporting the pilot signal.

5. Method according to claim 4,
characterised in that
the first specific number is 4 and the second specific number is 2.

6. Method according to claim 4 or 5,
characterised in that
the estimated characteristic values of the OFDM signal are symbolwise frequency offset ($\Delta\hat{f}_l$) and/or clock offset ($\hat{\xi}_l$) and/or phase offset resulting therefrom and/or gain ($\hat{g}_l$).

7. Method according to any of claims 4 to 6,
characterised in that
each data symbol (S1) has a useful part (30) separated by a guard period (31) from neighbouring data symbols (S2), whereby the length (τ) of the impulse response ($h(t)$) of the low pass filter (24) is shorter than the length (T_{GP}) of the guard periods (31) of the data symbols (S1, S2, ...).

8. Method according to claim 7,

characterised in that
the length (τ) of the impulse response ($h(t)$) of the low pass filter (24) is shorter than ¼ of the length of the guard periods (31) of the data symbols (S1, S2, ...).

9. Method according to any of claims 4 to 8,
characterised in that
the estimation of the synchronisation parameters is done for each symbol of the pilot signal and is averaged over several symbols.

10. Method according to claim 9,
characterised in that
the length (τ) of the impulse response ($h(t)$) of the low pass filter (24) is about 2.5/16 of the length of the guard periods (31) of the data symbols (S1, S2, ...).

11. Method according to any of claims 1 to 10,
characterised in that
the OFDM signal is resampled (25) after low pass filtering (24).

12. Analysing device (40) for analysing an OFDM signal ($r_{IF}(t)$) transporting a series of data symbols (S1, S2, ...) on several orthogonal carrier frequencies, each data symbol (S1) having a useful part (30) separated by a guard period (31) from neighbouring data symbols (S2),
whereby the analysing device (40) has a signal section (20) with a bandwidth (BW_A) smaller than the bandwidth (BW_{OFDM}) of the OFDM signal,
whereby the analysing device (40) has a low pass filter (24) for low pass filtering of the OFDM signal and a frequency shifter (26) for shifting the spectrum of the OFDM signal in order to obtain a frequency shifted filtered OFDM signal ($r(i)$), and
whereby the length (τ) of the impulse response ($h(t)$) of the low pass filter (24) is shorter than the length (T_{GP}) of the guard periods (31) of the data symbols (S1, S2, ...).

13. Analysing device (40) for analysing an OFDM signal ($r_{IF}(t)$) transporting a series of data symbols (S1, S2, ...) on several orthogonal carrier frequencies,
whereby the analysing device (40) has a signal section (20) with a bandwidth (BW_A) smaller than the bandwidth (BW_{OFDM}) of the OFDM signal within the OFDM signal,
whereby a first specific number of carrier frequencies transport a pilot signal,
whereby the analysing device (40) has a low pass filter (24) for low pass filtering of the OFDM signal and a frequency shifter (26) for shifting the spectrum of the OFDM signal in order to obtain a frequency shifted filtered OFDM signal ($r(i)$), and estimating means (12) for estimating several synchronisation parameters ($\Delta\hat{f}_l, \hat{\xi}_l$) of the OFDM signal by use of the pilot signal,
whereby the number of carrier frequencies transporting the pilot signal is reduced to a second specific number by the signal section (20) with its bandwidth (BW_A) smaller than the bandwidth (BW_{OFDM}) of the OFDM signal and
whereby the estimating means (12) averages the estimated synchronisation parameters ($\Delta\hat{f}_l, \hat{\xi}_l$) of the OFDM signal over several data symbols l in order to compensate the reduced number of carrier frequencies transporting the pilot signal.

14. Digital storage medium with control signals electronically readable from the digital storage medium, which interact with a programmable computer or digital signal processor in a manner that all steps of the method according to any of claims 1 to 11 can be performed.

15. Computer-program-product with program-code-means stored on a machinereadable data carrier to perform all steps of any of claims 1 to 11, when the program is performed on a programmable computer or a digital signal processor.

16. Computer program with programm-code-means to perform all steps of any of claims 1 to 11, when the program is performed on a programmable computer or a digital signal processor.

17. Computer program with program-code-means to perform all steps of any of claims 1 to 11, when the program is stored on a machinereadable data carrier.